Oral Health Surveys

BASIC METHODS

Third edition

WORLD HEALTH ORGANIZATION
Geneva

The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this organization, which was created in 1948, the health professions of some 165 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

By means of direct technical cooperation with its Member States, and by stimulating such cooperation among them, WHO promotes the development of comprehensive health services, the prevention and control of diseases, the improvement of environmental conditions, the development of health manpower, the coordination and development of biomedical and health services research, and the planning and implementation of health programmes.

These broad fields of endeavour encompass a wide variety of activities, such as developing systems of primary health care that reach the whole population of Member countries; promoting the health of mothers and children; combating malnutrition; controlling malaria and other communicable diseases, including tuberculosis and leprosy; having achieved the eradication of smallpox, promoting mass immunization against a number of other preventable diseases; improving mental health; providing safe water supplies; and training health personnel of all categories.

Progress towards better health throughout the world also demands international cooperation in such matters as establishing international standards for biological substances, pesticides, and pharmaceuticals; formulating environmental health criteria; recommending international nonproprietary names for drugs; administering the International Health Regulations; revising the International Classification of Diseases, Injuries, and Causes of Death; and collecting and disseminating health statistical information.

Further information on many aspects of WHO's work is presented in the Organization's publications.

Oral Health Surveys

Basic Methods

Third Edition

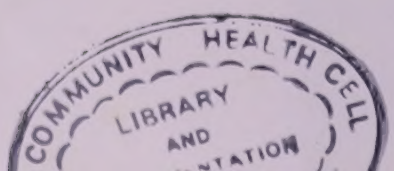
World Health Organization
Geneva 1987

ISBN 92 4 154216 0

TYPESET IN INDIA

PRINTED IN BELGIUM

86/7153-Macmillan/Ceuterick-7000



Contents

Preface

Basic oral health surveys provide a sound basis for estimation of the present status and future needs for oral health care of a population. They produce reliable baseline data for development of national or regional oral health programmes and for planning for appropriate numbers and types of personnel for oral care. The World Health Organization attaches great importance to basic oral health surveys, and is prepared to assist in their planning, and in analysing and summarizing data collected in country surveys.

Since the first edition of this manual was published in 1971, many professional bodies, including the International Dental Federation (FDI), and individual scientists have made valuable contributions to the development of methods for use in dental epidemiology. More than 100 health administrations have conducted oral health surveys in accordance with the recommended basic methods. Experience gained in these surveys has shown that some of the recommendations made in the first (1971) and second (1977) editions should now be revised. The assessment of periodontal diseases, especially, is in need of new methodology. The levels of intra- and inter-examiner variation in measuring periodontal disease have been unsatisfactory and the measurements made have not provided a means of estimating treatment needs and thus of calculating numbers of oral care personnel needed.

In 1977, a WHO Scientific Group[a] proposed a new epidemiological methodology for measurement of periodontal status and estimation of treatment needs. This group also recommended that the proposed method be carefully field-tested before being adopted, and in 1978, a Joint FDI/WHO Working Group was set up for this purpose. Investigators from 13 countries participated in the data collection.

---

[a] WHO Technical Report Series, No. 621, 1978 (*Epidemiology, etiology, and prevention of periodontal diseases*: report of a WHO Scientific Group).

After extensive data analyses and some modification to the method proposed originally, the Community Periodontal Index of Treatment Needs (CPITN) was defined, and was adopted by both WHO and FDI as the standard for collecting data on periodontal treatment needs of populations and for the planning and monitoring of oral health services. Information on this index is given in section 5, page 31.

Since the second edition of this manual was published in 1977, dramatic changes in oral health have occurred in many populations. These changes have resulted from disease trends and new treatment techniques as well as from changes in population structure. The recommended methodology for the planning of oral health services has thus been extended and refined[a] to examine the effects of these trends and changes on the oral health status of different age cohorts of the population and thereby to provide a more accurate estimation of future treatment needs of the population. The modifications in the third edition of this manual reflect the need to collect specific data to fit this new approach to planning. Thus collection of information on possession of fixed and removable prostheses, and the need for their repair or replacement has been added. Estimations of treatment needs for periodontal tissues and of needs for full dentures are based on oral status data; assessment of needs for partial dentures or bridges has been included as a separate item.

In line with the need to collect data in the older adult groups, especially in industrialized countries, a new index age of 65–74 years has replaced the previously used age group of 65+.

The collection of all information on the basic form is recommended for both planning and monitoring of services. There may, however, be situations where fewer items of information are needed. A reduced recording form, which uses the same criteria and codes as the full survey form is available for surveys of children up to 15 years of age.

Guidance on research and advanced applications of the epidemiological process in the oral health area that are not included in this manual is available from the World Health Organization, 1211 Geneva 27, Switzerland.

---

[a] Agreed methodology resulting from a workshop held in Utrecht, Netherlands, in March 1986, to complete the work of the WHO/FDI Joint Working Group on Guidelines for Planning and Monitoring for Oral Health and Care: Health through Oral Health. For more information, contact Oral Health, World Health Organization, 1211 Geneva 27, Switzerland.

Aims of the manual

The aims of this manual are as follows:

1. To provide a systematic approach to the collection and reporting of data on oral diseases and conditions;
2. To ensure that data collected in a wide range of environments are comparable;
3. To encourage oral health administrators in all countries to make standard measurements of oral diseases and conditions as a basis for planning and evaluating oral health programmes.

To achieve these aims the manual provides:

1. Guidelines on a practical and economic sample design approach suitable for assessing oral diseases and treatment needs, for planning and monitoring oral health services;
2. A description of diagnostic criteria that can be readily understood and applied in all countries, regardless of the concepts held and the training and experience of the oral health personnel;
3. Information on means of obtaining practical assistance in planning and implementing surveys, summarizing data, and analysing results.

Chapter 1 describes general principles for designing basic oral health surveys on which both monitoring of oral disease trends and estimation of oral care needs for populations can be based; Chapter 2 gives advice on organizing and conducting a survey; Chapter 3 describes ways of ensuring that the data collected are as consistent and reliable as possible; Chapter 4 deals with procedures and methods for collecting basic data on oral health status and treatment needs; Chapter 5 gives instructions on completion of the standard survey forms; and Chapter 6 explains how survey reports should be prepared and presented. A list of the tables that can be prepared at WHO from data collected in a basic oral health survey is given in Annex 1.

1. Design of a Basic Oral Health Survey

Objectives

Basic oral health surveys are defined as surveys to collect the basic information about oral disease status and treatment needs that is needed for planning or monitoring oral health care programmes. They are *not* designed to collect information about etiological factors affecting disease distribution or severity, or about the clinical effectiveness of different preventive or care procedures. However, the methods used in basic surveys, though usually not suitable for detailed clinical evaluations, can be used to monitor overall effectiveness of care services.

Surveys to determine the oral health status and treatment needs of communities and populations are an essential part of the duties of chief dental officers and other administrators responsible for oral health care services. Where there is no national or regional dental officer with specific responsibility for oral health activities, either members of the dental association, or staff of training institutions for oral care personnel, should undertake regular epidemiological surveys of oral health conditions. The objectives of such surveys are initially to provide a full picture of the oral health status and needs of a population, and subsequently, to monitor changes in disease levels or patterns. In this way, it is possible to assess the appropriateness and effectiveness of services being provided and to plan, or replan, oral care services and training programmes, as needed.

It is strongly recommended that, in baseline and regular 5-yearly monitoring surveys, information is included on all the items on the basic form (see page 26).

Using the full methodology presented, it is possible to determine:

1. The extent to which existing oral health services are coping with the current need for care;
2. The nature and extent of required preventive, curative, and restorative services;

3. The resources needed for establishing, maintaining, expanding or reducing an oral health care programme, including an estimate of number and type of personnel required.

Special characteristics of oral diseases

In some situations, investigators will have access to the advice of an expert in health statistics who might be able to provide guidance on planning a survey. However, there are particular considerations about the epidemiology of oral diseases that have enabled the development of an approach to sample design and survey planning for the most common oral diseases which is different from traditional sample designs. These special considerations concerning the two major oral diseases—dental caries and periodontal diseases—are as follows:

1. The diseases are strongly age-related.
2. A relatively high percentage of the population is affected.
3. One of the diseases, dental caries, is irreversible and thus information on current status provides data not only on the amount of disease present, but also on previous disease experience.
4. There is a clear pattern of increase in disease severity with increase in prevalence.
5. These common oral diseases exist in all populations, varying only in intensity and prevalence.
6. There is extensive documentation on variation of profiles of dental caries for population groups with different socioeconomic levels and environmental conditions.
7. Many observations are made in standard measurements for each subject, i.e., for each tooth in caries and for the six sextants of the mouth in the assessment of periodontal disease.

"Pathfinder" surveys

Whereas in other areas of health care there is a need to sample a specified proportion of the population, e.g., 0.1 % or 1 %, in order to be able to estimate disease prevalence accurately, the special factors associated with oral diseases and the great experience gained in oral epidemiology over the last 20 years have enabled a practical, economic survey sampling methodology to be defined, called "pathfinder" methodology.

The method used is a stratified cluster sampling technique, which aims to include the most important population subgroups likely to have

differing disease levels, and to cover a standard number of subjects in specific index age groups in any one location. In this way, statistically significant and clinically relevant information for planning is obtained at minimum expense. This methodology is suitable for obtaining the following information:

- The overall prevalence of the various oral diseases affecting the population;
- Important variations in disease level, severity and need for treatment in subgroups of the population. This enables groups in special need of high priority development of services to be identified;
- A picture of the age profiles of oral diseases in the population to enable care needs for different age groups to be determined, to provide information about severity and progression of disease, and to give an indication as to whether the levels are increasing or decreasing.

Pathfinder surveys can be classified as either pilot or national, depending on the number of sampling sites and the age groups or index ages included.

A *national pathfinder survey* incorporates sufficient examination sites to cover all important subgroups of the population that may have differing disease levels or treatment needs, and at least three of the index ages or age groups (see page 7).

A *pilot survey* is one that includes only the most important subgroups in the population and only one or two index ages, usually 12 and 15 years. Such a survey provides the minimum amount of data needed for commencing planning in many situations. Additional data should then be collected in order to provide a reliable baseline for the implementation and monitoring of services.

This type of survey design for collection of planning and service monitoring data is suitable for all countries whatever the level of disease, availability of resources, or complexity of services. In a large country with many geographic and population subdivisions and a complex service structure, a larger number of sampling locations is needed. The basic principle of using index ages and standard samples in each location within a stratified approach, however, remains valid. The process of weighting according to percentage population distribution for a specified age or age group sampled can then be applied, if necessary, to the means for grouped clusters, e.g., urban vs. rural, in order to give as close an estimate as possible for the population as a whole.

Pathfinder methodology

Subgroups. Sampling sites are usually chosen so as to provide results for population groups likely to have different disease rates. The results should be related to the administrative divisions of a country—the capital city, main urban centres, and small towns or rural areas. In countries where there are distinct different geophysical areas, it is usual to include at least one sample subgroup in each area type.

If there are several distinct ethnic groups in the population with known, or suspected, differences in disease patterns, it may be necessary to include separate samples of each of these groups in the main subdivisions for the survey. However, maximum use should be made of available knowledge about variations between the different groups in order to limit the number of additional subsamples needed.

The assistance of local health administrators can be very useful when the final decision is made as to which population subgroups are significant for the study and should be represented in the final sample. Between 10 and 15 sampling points are usually sufficient for countries with small to moderate populations. If, however, there are large urban centres in the country, it might be necessary to locate several additional sampling points in at least two cities.

Index ages and age groups. The following ages and age groups are recommended: 12, 15, 35–44 and 65–74 years.

(*a*) *12 years.* This age is especially important, as it is generally the age at which children leave primary school, and thus in most countries, is the last age at which a reliable sample may be obtained easily through the school system. For this reason, 12 years has been chosen as the global monitoring age for caries for international comparisons and monitoring of disease trends. However, in some countries, many school-age children do not attend school. In these circumstances, an attempt should be made to survey two or three groups of non-attenders, from different areas, in order to compare their oral health status with that of children going to school.

(*b*) *15 years.* Data for persons of this age can be compared with the data for 12-year-olds to provide an estimate of increases in prevalence and severity of caries; this is particularly useful in populations for which there are no, or very little, previous data. This age is also important for the assessment of periodontal disease indicators in adolescents. In countries where it is difficult to obtain reliable samples of this age group, it is usual to examine 15-year-olds in two or three areas only,

i.e., in the capital city or other large town and in one rural area.

(*c*) *35–44 years.* This age group is the standard monitoring group for health conditions of adults. The full effect of dental caries, the level of severe periodontal involvement, and general effects of care provided can be monitored using data for this age group. Sampling adult subjects is often difficult. Samples can, however, be drawn from organized groups, such as office or factory workers. Use may also be made of readily accessible groups, e.g., at a market, to obtain a reasonably representative sample in situations where truly representative sampling is impossible. Care must be taken to avoid obvious bias, such as sampling outpatients at a dental clinic.

(*d*) *65–74 years.* This age group has become very much more important with the changes in age distribution and increases in life-span that are now occurring in all countries. Data for this group are needed both for planning appropriate care for the elderly and for monitoring the overall effects of oral care services in a population. Examination of representative members of this age group is often not as difficult as for the previous age group, as elderly people are more likely to be found in or near their homes, or in day centres or institutions and can thus be examined during the day.

Detailed assessment of dental caries of the primary dentition at the age of 5 and 6 years is not recommended for routine inclusion in a basic oral health survey. However, in order to monitor the achievements of preventive programmes and, in particular, disease trends, it is recommended that a count of caries-free 5- and 6-year-old children be made in one class at each school in which 12-year-olds are examined. It is also possible to record the number of primary teeth that are decayed, missing or filled; relevant codes have been included as an option on the standard WHO forms.

Number of subjects. The standard number of subjects in each index age group to be examined ranges from 25 to 50 for each cluster or sampling point, depending on the expected prevalence and severity of oral disease. The minimum number of subjects acceptable for analysis as one cluster is 20, but allowance must be made for the possibility that a subject's form may be eliminated during data processing because of operator, recorder, or examiner error. It is therefore strongly recommended that a minimum cluster size of 25 subjects per age group be examined to allow a margin for error.

However, a total of 20 25 subjects, with an approximately equal number of females and males, is sufficient only in populations where caries and periodontal disease levels are estimated to be low or very low. In populations where these disease levels are known to be moderate or high—e.g., the percentage of caries-free 12-year-olds is 5 10% or lower—the standard size for each sample should be 40–50 subjects.

If the level of dental caries in the population is unknown, it will be necessary to estimate the level of disease before starting a survey. A rapid and effective way of estimating the prevalence of caries in a population is by classifying a group of subjects as caries-free or not. For example, it should be possible to examine 2 or 3 classes of 12-year-olds of different socioeconomic levels, in 2 or 3 local, easily accessible schools, where the widest possible differences in disease may be expected. If more than 20% of the children in the class are caries-free, the caries prevalence is low; if 5–20% are caries-free, the prevalence is moderate; and if fewer than 5% are caries-free, the prevalence is high. This estimate of prevalence may then be used as a guide when deciding on standard sample size and when completing the checklist for survey planning and sampling design (see Annex 2).

Level of precision

The following example is a practical guide to total sample size and is based on dental caries data for 12-year-olds. The level of precision in estimating caries prevalence (i.e., number of decayed, missing, or filled teeth (DMFT)), from a sample of 100 subjects, is shown below for low, moderate and high caries prevalence.

Caries prevalence	*Proportion of caries-free 12-year-olds* (%)	*Level of precision for estimate of DMFT for sample size, n = 100*
Low	>20	±0.4
Moderate	5–20	±0.5
High	<5	±1.0

As an example, consider a population with a moderate level of caries. A sample of 100 subjects of 12 years of age is examined, and the mean DMFT per person is found to be 4.1. This means that the value of the DMFT for the whole population of 12-year-olds is somewhere between 3.6 and 4.6 (4.1 ± 0.5). This level of precision is certainly sufficient to allow the data from such a survey to be used in planning oral care services.

The sample groups for each index age or age group can be divided as follows:

urban:	4 sites in the capital city or metropolitan area	$(4 \times 25 = 100)$
	2 sites in each of 2 large towns	$(2 \times 2 \times 25 = 100)$
rural:	1 site in each of 4 villages in different regions	$(4 \times 25 = 100)$
total =	12 sites × 25 subjects	= 300

Applying this cluster distribution to the entire population (all index ages and age groups) the total sample is $4 \times 300 = 1200$.

Using such a sample, comparison can then be made between urban and rural groups and, in certain situations, between different socioeconomic groups in the capital city or large towns. Areas where the disease prevalence is either much higher or much lower than the national average may also be identified from the results of such a survey. As a general guideline for basic oral health surveys for planning, monitoring and evaluating oral care services, this pathfinder approach to sample design and selection is recommended.

Obtaining assistance from WHO

It is helpful to discuss the survey and the proposed plan with experienced colleagues in the health or education sectors so that areas or factors of importance and interest are not neglected or forgotten. Further discussion and more detailed calculation of appropriate sample sizes for different research-oriented investigations according to specified precision and confidence levels may be requested from Oral Health, World Health Organization, 1211 Geneva 27, Switzerland.

Care should be taken to prepare a written protocol for the study, listing information from previous surveys undertaken or available from other sources, and carefully defining the exact type of information sought and proposed use of the data to be collected.

WHO is willing to assist with survey planning, in particular with advice on the sampling plan and choice of the standard or the reduced recording form. The aims of such assistance are to foster the use of uniform survey methods and to help investigators develop objectives and survey plans to meet their specific needs. Investigators are invited to complete a checklist for survey planning and sampling design, or provide the same information in writing, when requesting WHO assistance. WHO will supply the following materials:

1. Checklist for survey planning (Annex 2);
2. Standard record forms (see pages 26 and 27), either single copies for reproduction locally or in bulk to cover survey requirements

(a supply of forms is kept at WHO headquarters and these are available to investigators who encounter serious difficulties in obtaining the forms they need);

3. Survey summary sheets for detailing codes specific to the survey in question (Annex 3);
4. Leaflets for field use providing a summary of examination criteria and codes.

At an investigator's request, WHO is also prepared to assist with the summary and analysis of data derived from the use of procedures recommended in this manual, provided that the standard format and coding described in the manual have been used. The analysis will be carried out, without fee, using a standard computer program, which will produce a standard set of tables (see Annex 1). A brief summary of the final results of all data analysed by WHO will be automatically included in the WHO Global Oral Data Bank (GODB).

It should be noted that, even if WHO assists with the planning, analysis, or findings of a survey, it is the investigator's responsibility to obtain permission to conduct the survey from the responsible authorities. It is especially important that the investigator should obtain local permission to carry out a survey in any country or locality of which he or she is not a national or local resident (see page 12).

2. Organizing the Survey

Obtaining approval from the authorities

Permission to examine population groups must usually be obtained from a local, regional, or national authority. If school populations are to be examined, for example, school authorities should be approached and the purpose of the survey explained to them. Their approval of the programme should be obtained to ensure full cooperation. In some areas, written permission from parents must be obtained before children can be examined. The survey planner should also notify the health authorities, since it may be necessary to time the survey to fit in with other health-related activities. This applies particularly when adult populations are to be surveyed.

It is most important to acquaint the dental profession and oral health administrators in the area with details of the survey. Officers of dental societies and local dental practitioners can often help in gaining the cooperation of the community for the survey, and of any of their patients who may be included in the sample.

Scheduling

One of the most important aspects of survey planning is the preparation of an orderly schedule for data collection. If this is not done, examining personnel may waste valuable time waiting for subjects to arrive, or be otherwise unnecessarily delayed.

The planner can estimate from the preliminary survey, or from previous experience, how much time, on average, each examination will take. Daily and weekly schedules can then be prepared. These should be made available to survey personnel, as well as to school and health authorities. The schedules should allow for some flexibility so that unexpected delays do not cause major upsets in the survey timetable.

Reliable observations and consistent judgements are important in surveys. Since fatigue contributes significantly to inaccuracy and

inconsistency, it is unwise to make the schedule too demanding. For example, if classes of 20 to 30 children in several schools are to be examined by one examiner, the planning schedule should include time for (*a*) introducing the examining team to the school director and class teachers concerned; (*b*) choosing an appropriate place to carry out the examinations in each school, and setting up equipment; (*c*) examining one class of 12-year-olds; (*d*) providing a brief oral report to the school director; and (*e*) travelling to the next school. This would normally take about two hours, giving a total of approximately 60–80 subjects per day, or 300–400 children in a 5-day period. It is not advisable to schedule more than 15 children to be examined in one hour.

Emergency care

All survey teams should be equipped for, and ready to provide, emergency care if required. This service is especially important in remote areas where there are no regular oral health services. However, permission should be obtained from the competent authority for members of the survey team to give emergency care where necessary.

Courtesy reporting

It is appropriate, and often essential, to report the survey findings to local authorities. The report may be a simple summary of the number of subjects examined and the observations of the examiner. This can usually be delivered personally, on the spot. A full technical report will require more time to prepare and will have to be sent later. Occasionally, both types of report will be necessary.

3. Reliability of Data

"Calibrating" examiners

Although examiners may differ in their assessments of the oral health status of individuals, they should be in close agreement in assessing the status of population groups. When an epidemiological survey is undertaken by a team, it is essential that the participating examiners be trained to make consistent clinical judgements. There are two main reasons for variability of results:

- Diseases such as dental caries and periodontal disease begin as microscopic lesions that cannot be diagnosed by clinical methods. Until these disease processes have reached a relatively advanced level, they may be inconsistently detected.
- Physical and psychological factors, such as fatigue, fluctuations in interest in the study, difficulty in making decisions, and variations in visual acuity and tactile sense, all affect the judgement of examiners from time to time and to different degrees. Different disease prevalence rates may interact with these factors to affect the consistency of clinical observations.

The objectives of standardization and calibration are:

1. To ensure uniform interpretation, understanding and application of the criteria for the various diseases and conditions to be observed and recorded;
2. To ensure that each examiner can examine to a "uniform" standard; and
3. To minimize variations between different examiners.

This manual is designed to facilitate the achievement of the first objective by defining criteria in clear and precise terms. The best method for fulfilling the second and third objectives will depend on the number of examiners taking part in the survey.

When only one examiner is involved, he/she should determine how consistently he/she can apply the diagnostic criteria by examining a

group of about 20 patients twice, on successive days. These patients should be pre-selected so that they possess, collectively, the full range of conditions expected to be assessed in the main survey. By comparing the results of the two examinations, the examiner will be able to obtain an estimate of the extent and nature of the diagnostic errors. If the number of errors is large, the examiner should review the interpretation of the criteria and conduct additional calibration examinations until he she can achieve acceptable consistency in his/her assessments.

It is not possible to give a precise definition of "acceptable consistency". In general, agreement for most assessments should be in the range of 85–90%.

When the survey is to be conducted by a group of examiners, it is necessary to assess the consistency of each examiner and also the variations between examiners. This can be done by asking each examiner to examine the same group of 20 or more patients and comparing the findings. When findings contain major discrepancies, subjects should be recalled in order that differences in diagnoses can be reviewed by the examiners and resolved by group discussion. It is essential that a group of examiners should be able to examine with reasonable consistency, using a common standard. If some examiners consistently record significantly more or fewer items than the majority and attempts to correct their performance fail, they should be excluded from the survey team. It should be made clear to all potential examiners, before the calibration trials begin, that ability to standardize examination results is not a measure of clinical skill.

Unless all members of the survey team can examine in a consistent manner, regional or group variations in disease prevalence or severity may be missed or wrongly interpreted. Since there will always be some variation between examiners, it is advisable that, in the actual survey, they should all examine similar percentages of each major group of the sample population.

Duplicate examinations

Examiners may change the way they apply diagnostic criteria during the course of a long series of examinations. To reduce this tendency, and to measure its extent, it is advisable for each examiner to conduct duplicate examinations on about 10% of the sample in the main survey. As far as possible, the examiner should not be able to identify the subjects who are re-examined, or know that a subject has been examined previously, since this information may affect the thoroughness or quality of the re-examination. The recorder, or perhaps a local

schoolteacher, should be requested to arrange for the re-examination of 10% of the subjects during the course of the survey. In a large survey, it is preferable to perform duplicate examinations at the beginning (i.e., during calibration), about half-way through the survey, and at the end of the survey. This will also give information on changes occurring during the survey period. Care must be taken to carry out at least 25 duplicate examinations in each age group at each period, so that a reasonable estimate of changes can be made.

4. Implementing the Survey

General

Contacts with persons in authority

The organization of a survey should commence well before the date on which it is intended to start examinations. It is necessary to contact persons in authority in the institutions or organizations where people will be examined. For example, in schools, the principal should be contacted for information as to when the school is in session, when the children will be available for examination, and whether there is a suitable area or room that could be used for the examination. In addition, the principal will be able to provide basic information about the socioeconomic level and nutritional status of the children, water sources, and any health promotion or health education activities carried out in the school. The organizer of the survey should maintain a log-book in which are recorded the location of each day's examinations, the number of persons examined, and information about each school. Occasionally, observations made and impressions formed at this time can have an important bearing on later assessment of survey results. If these are not clearly described at the time of observation, they will either be forgotten or confused.

Preliminary exercise

For investigators planning their first oral health survey, it is helpful to examine two classes of 12-year-old children in local primary schools as a preliminary exercise. This will give the survey personnel an opportunity of working together, and of identifying and discussing any organizational or technical problems that may arise. The calibration examination and training of the recorders can be performed at the same time.

Samples of drinking-water

A sample of drinking-water should be collected at each examination site, and sent for analysis of fluoride content. Clean polyethylene bottles of 25–30 ml capacity are adequate. They should be rinsed in distilled water prior to use. If they have already been used for sample collection, they should be washed in a dilute hydrochloric acid solution and then rinsed several times in distilled water. In general, it is possible to obtain fluoride analysis services through public health and/or water supply departments. However, if analytical facilities are not easily available, WHO can arrange for a Collaborating Centre to perform the analyses.[a]

Personnel and organization

Recording clerk

Each examiner should be assisted by an alert and cooperative recording clerk who is able to follow instructions exactly and to print numbers and letters clearly (see also page 23). The examiner should give the clerk clear instructions about recording data on the survey form. The clerk should be told the meaning of the terms that will be used and instructed in the coding systems so that, with practice, obvious mistakes made by the examiners can be recognized. Before the survey begins, the clerk should practise by recording findings from a few preliminary examinations. Special instructions and additional practice must be given if the clerk is not familiar with the alphabetical or numerical symbols used on the survey form. This is especially important when dental caries are being recorded because the same coding boxes are used for both the primary and permanent dentitions. The only distinction is in the notation used, i.e., letters for primary teeth and numbers for permanent teeth (see page 34). Failure to ensure that the recording clerk makes clear entries may result in confusion between symbols and render the survey data useless.

Organizing clerk

It is also desirable to have an organizing clerk at each examination site to maintain a constant flow of subjects to the examiner or examiners and to enter general descriptive information on the record

---

[a] For more information, contact Oral Health, World Health Organization, 1211 Geneva 27, Switzerland.

forms. The organizing clerk should also scan the finished records for accuracy and completeness, so that missing information may be obtained before the survey team moves to another location. This person should be responsible for ensuring that the examiners have an adequate supply of sterile instruments.

Daily review of record forms

It is very important that the examiner reviews each day's record forms the same evening, for completeness and accuracy of recordings.

Instruments and supplies

The quantity and weight of instruments and supplies used in the survey should be kept to a minimum. The following instruments and supplies are required for each examiner:

- Caries explorers;
- Plane mouth mirrors;
- Periodontal probes designed according to approved specifications (addresses of companies manufacturing this probe may be obtained from the Oral Health unit of WHO (see footnote *a*, page 18));
- Pans for sterilizing instruments, concentrated sterilizing solution;
- Wash basins (one for plain water and one for water with soap);
- Cloth or paper hand towels and soap;
- Gauze pads for removing debris from around the teeth.

Sufficient numbers of instruments should be available to avoid the need to interrupt examinations while used ones are sterilized. *A minimum of 10 sets* per examiner should be provided, as this will permit instruments to remain in sterilizing solution for approximately 30 minutes while the others are being used.

Examination bed or chair

The subjects can be examined on a simple bed or school table to which a portable head-rest may be attached (see Fig. 1) and the examiner should be seated. Otherwise, a straight chair to which a portable head-rest can be clamped would be sufficient. If none of these is available, it is possible to use a straight chair with a tall back on which the subject's head can rest.

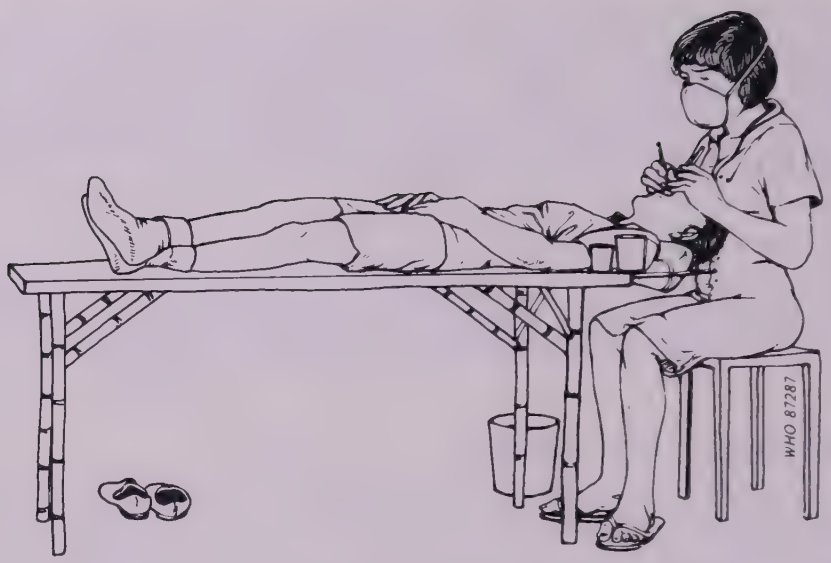


Fig. 1. Bed and head-rest

Lighting

The lighting should be as consistent as possible throughout the survey. If electricity is available at all locations, a lightweight portable examination light (blue–white) should be used. Inflammatory and structural changes of the oral tissues are more difficult to detect under incandescent light than under natural or corrected artificial light. If artificial light is used, natural light should be excluded as far as possible. If electricity is not available at some examination locations, natural light should be used at all locations.

Examination area

The area for conducting examinations should be planned and arranged for maximum efficiency and ease of operation. The exact arrangement will be determined by the physical condition of the site, but certain controllable features should be kept in mind.

Light source

If an artificial light source is used, the location of the electrical supply points will affect the positioning of the bed or chair. If artificial light is being used and there is also a natural light source for the room in which the examinations will be made, the examining chair should face

away from the natural light source, to avoid variation in illumination. However, if natural light alone is being used, the subject should be seated in such a position as to receive maximum illumination, while avoiding discomfort from direct sunlight on either the patient or the examiner. The chair should face the opening through which light enters, and be placed as close to it as possible.

Table or platform

A table or platform to hold dental instruments and basins should be within easy reach of the examiner.

Seating of recording clerk

The recording clerk should face the examiner so that he/she can easily hear instructions and codes and the examiner can see that findings are being recorded properly. In this position, also, the recorder is able to check that the region or tooth called is in fact the region or tooth that has just been examined.

Supply of survey forms

A generous supply of survey forms, carbon paper, hardboard bases and clips, sharpened pencils, erasers and a copy of the recording instructions and measurement criteria should be readily available.

"Traffic" arrangements

If possible, the examination area should be partitioned or arranged in such a way that subjects enter at one point and leave at another.

Avoidance of crowding

Subjects should not be permitted to crowd around the examiner or recorder but should approach the examination chair one at a time.

It is important to realize that lack of a suitable building does not preclude the conducting of a survey. If necessary, examinations can be performed in the open air at the edge of a shady area.

5. Survey Forms

General

Suitable forms for recording the results of oral health assessments described in this manual are reproduced on pages 26 and 27. As stated on page 10, supplies of these forms are available from WHO on request, but it is preferable that investigators arrange to have them reproduced locally. It is strongly recommended that survey forms should be completed in duplicate or photocopied as a safeguard against loss. Each recorder should use a board with a clip at the top to hold the recording forms and carbon paper (if used) in position. Although this may entail extra work, it is a worthwhile precaution, especially when surveys are being conducted in remote or inaccessible areas where transport may not be reliable.

Alternatively, if transport is easily available, completed forms may be packed and dispatched by post or carrier to the analysis centre at the end of each day's or week's work. In this way, the risk of losing *all* the survey data is greatly reduced.

Standard codes

Standard codes should be used for all parts of every form. If this requirement is not observed, WHO cannot perform the data processing and summary because the standard computer programme will be unsuitable. Even where some of the oral health assessments are not carried out, or are not applicable to the age group being examined, the codes must remain unchanged and the unused sections of the form cancelled with a diagonal line. Leaflets giving criteria and codes for recording survey data can be obtained from WHO and should be distributed to all members of the examining team.[a]

---

[a] Copies of these leaflets in English or French are available to investigators free of charge from Oral Health, World Health Organization, 1211 Geneva 27, Switzerland.

The forms are designed to facilitate computer processing of the results. Each box is given an identification number (the small number in parentheses), which represents a location in a computer file. Recording codes are shown near the appropriate boxes. To minimize the number of errors, all entries must be clear and unambiguous. Confusing similarities commonly occur in writing 1 and 7, 2 and 4, and 6 and 0. To avoid confusion and the danger of computing inaccurate results, numerals should be printed clearly in the following manner:

When letters are used, as in recording the status of primary teeth, they should be written in capitals as follows:

Clear enunciation is essential when calling out scores to recorders in order to differentiate unmistakably between similar sounding codes, e.g., eight and A. Adoption of a word system such as the international airline system—A-able, B-baker, etc.,—may be useful.

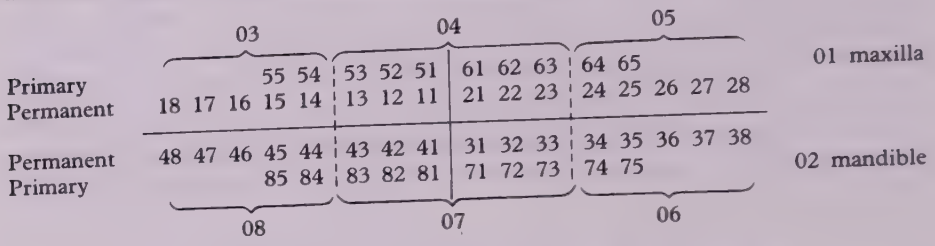
The following codes, accepted by the International Organization for Standardization (ISO), are used to indicate parts of the mouth:

01 indicates the upper jaw;
02 indicates the lower jaw;
03 to 08 indicate the sextants of the mouth in order,
- sextant 03, upper right posterior teeth;[b]
- sextant 04, upper incisors and canines;
- sextant 05, upper left posterior teeth;
- sextant 06, lower left posterior teeth;
- sextant 07, lower incisors and canines;
- sextant 08, lower right posterior teeth.

The two-digit numbers above or below some of the boxes indicate specific teeth, according to the system used by the International Dental

[b] Molars and premolars.

Federation (FDI). The first digit specifies the quadrant of the mouth and the second the actual tooth (see below):



In designating a tooth, it is recommended to call the quadrant number, then the tooth number—for example, the upper right second incisor, 12 = "one-two" rather than "twelve"; the lower left third molar, 38 = "three-eight" rather than "thirty-eight".

Oral health assessment form

The standard form for oral health assessment (see page 26) is designed for collection of all the information needed for planning oral care services and thorough monitoring and replanning of existing care services. The form includes the following sections:

Information	*Box No.*
survey identification information	1–12
general information	13–23
malocclusion	24
periodontal status (CPITN)	25–30
dentition status and treatment need	31–94
fluorosis	95
opacities and other disorders of the enamel	96–98
denture wearing	99–100
need for dentures	101–102
oral mucosa and bone lesions	103–113
temporomandibular joint assessment	114
need for immediate care	115–118
other conditions	119–120

This form is suitable for use in surveys in which children or adults are examined. Where only children are examined, it would not usually be necessary to record wearing of or need for dentures, or presence of oral mucosal lesions. Similarly, if adults only are included in a survey, it may be of little use to record fluorosis or dentofacial anomalies. Where a simple survey is required for children, an alternative form, which includes only malocclusion, periodontal status, dentition status and treatment needs assessment, and fluorosis may be used (page 27); copies of this form are available from the Oral Health unit of WHO. It

should be stressed, however, that in general, collection of all the information included on the standard basic form is needed for planning or monitoring oral care services.

Identification and general information sections of the survey form

The investigator should write the name of the country in which the survey was conducted in bold letters on the first page of each batch of forms sent to WHO for processing. Boxes 1–4 on the form are reserved for the WHO code for the country in which the survey is carried out and should not be filled in by the investigator.

During the planning of the survey, a list of examination sites should be made and a two-digit code should be assigned to each site; the appropriate code should then be recorded in boxes 18 and 19 of each form during the survey. Similarly, a list of the examiners who will be involved in the study should be made and a code assigned to each one. If there is information about ethnic groups and occupations, or if it is intended to record other information such as fluoride content of the water or use of fluoride tablets, then the codes for this information should also be included in the coding list.

Date of examination

The year, month and day should be written on the form at the time of the examination. Only the year (recorded in boxes 5 and 6) will be entered into the computer data file. Recording the day and month enables an investigator to refer back to any one day's examinations that may need to be reviewed in relation to survey notes.

Identification number

Each subject examined should be given an identification number. This number should always have the same number of digits as the total of subjects to be examined. Thus, if it is intended to examine some 1200 subjects, the first subject is numbered 0001. These numerals should be entered in boxes 7 to 10.

If possible, the identification numbers should be entered on the forms before the day's work starts. It is important to ensure that each identification number is used only once. Cross-checking is necessary when more than one examiner participates in a survey. If a total of 1200 subjects are to be surveyed by two examiners, examiner 1 should use numbers 0001 0600, and examiner 2, numbers 0601 1200.

WHO ORAL HEALTH ASSESSMENT FORM (1986)

COUNTRY

Leave Blank (1) (4) | Year (5) (6) | Month Day | Identification Number (7) (10) | Original/ Duplicate (11) | Examiner (12)

GENERAL INFORMATION

Name .....

Age in years (13) (14)

Sex (M=1, F=2) (15)

Ethnic Group (16)

Occupation (17)

Geographic Location (18) (19)

Location type:
1 = urban
2 = periurban
3 = rural
(20)

OTHER DATA (specify and provide codes)

..... (21)

..... (22)

..... (23)

MALOCCLUSION

0 = none
1 = slight
2 = moderate or severe
(24)

PERIODONTAL STATUS (CPITN)

17/16 11 26/27
(25) (27)
(28) (30)
47/46 31 36/37

0 = healthy
1 = bleeding
2 = calculus
3 = pocket 4-5 mm (black band of probe partially visible)
4 = pocket 6 mm or more (black band of probe not visible)
x = excluded sextant

DENTITION STATUS AND TREATMENT NEED

55 54 53 52 51 61 62 63 64 65
18 17 16 15 14 13 12 11 21 22 23 24 25 26 27 28
status
(31) (46)
(47) (62)
treatment

85 84 83 82 81 71 72 73 74 75
48 47 46 45 44 43 42 41 31 32 33 34 35 36 37 38
status
(63) (78)
(79) (94)
treatment

STATUS

Permanent Teeth	Primary Teeth
0 = sound	A
1 = decayed	B
2 = filled & decayed	C
3 = filled, no decay	D
4 = missing due caries	E
5 = missing any other reason	–
6 = sealant, varnish	F
7 = bridge abutment or special crown	G
8 = unerupted tooth	–
9 = excluded tooth	–

TREATMENT

0 = none
1 = caries arresting or sealant care
2 = one surface filling
3 = two or more surface fillings
4 = crown or bridge abutment
5 = bridge element
6 = pulp care
7 = extraction
8 = need for other care
9 = (specify)

FLUOROSIS

(95)

0 = normal
1 = questionable
2 = very mild
3 = mild
4 = moderate
5 = severe

OPACITIES AND OTHER ENAMEL DISORDERS

(96) (97) number of teeth affected (98)

0 = none
1 = opacities
2 = hypoplasia
3 = tetracycline
4 = mutilation
5 = attrition
6 = more than one condition, specify

DENTURE WEARING

upper lower
(99) (100)

0 = no denture
1 = partial denture
2 = full denture

NEED FOR DENTURES

upper lower
(101) (102)

0 = no denture needed
1 = need to repair denture
2 = need for partial denture
3 = need for full denture

ORAL MUCOSA & BONE LESIONS

(103) (107)
(108) (112)
ICD-DA Codes

unidentified lesion (113)

TEMPORO-MANDIBULAR JOINT ASSESSMENT

(114)

0 = TMJ normal
1 = TMJ clicking
2 = self-correcting blocking
3 = dislocation of TMJ
4 = pain related to TMJ

NEED FOR IMMEDIATE CARE

life-threatening condition (115)
jaw/s fracture (116)
pain or infection (117)
referral to care (118)

0 = absent
1 = present/referral

OTHER CONDITIONS

(specify and provide codes)

..... (119)
..... (120)

WHO ORAL HEALTH ASSESSMENT FORM (1986)
(SIMPLIFIED)

COUNTRY

Leave Blank (1) ☐☐☐☐ (4)

Year (5) ☐☐ (6)

Month Day ☐☐☐☐

Identification Number (7) ☐☐☐☐ (10)

Original/ Duplicate ☐ (11)

Examiner ☐ (12)

GENERAL INFORMATION Name .....

Age in years (13) ☐☐ (14)

Sex (M=1, F=2) ☐ (15)

Ethnic Group ☐ (16)

Occupation ☐ (17)

Geographic Location (18) ☐☐ (19)

Location type:
1 = urban
2 = periurban
3 = rural
☐ (20)

OTHER DATA (to be specified)

..... ☐ (21)

..... ☐ (22)

..... ☐ (23)

MALOCCLUSION

0 none
1 slight
2 moderate or severe
☐ (24)

PERIODONTAL STATUS (CPITN)

17/16 11 26/27
(25) ☐☐☐ (27)
(28) ☐☐☐ (30)
47/46 31 36/37

0 = healthy
1 = bleeding
2 = calculus
3 = pocket 4-5 mm (black band of probe partially visible)
4 = pocket 6 mm or more (black band of probe not visible)
x = excluded sextant

DENTITION STATUS AND TREATMENT NEED

55 54 53 52 51 61 62 63 64 65
18 17 16 15 14 13 12 11 21 22 23 24 25 26 27 28
status
(31) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (46)
(47) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (62)
treatment

85 84 83 82 81 71 72 73 74 75
48 47 46 45 44 43 42 41 31 32 33 34 35 36 37 38
status
(63) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (78)
(79) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ (94)
treatment

STATUS

Permanent Teeth	Primary teeth
0 = sound	A
1 = decayed	B
2 = filled & decayed	C
3 = filled, no decay	D
4 = missing due caries	E
5 = missing,any other reason	-
6 = sealant, varnish	F
7 = bridge abutment or special crown	G
8 = unerupted tooth	-
9 = excluded tooth	-

TREATMENT

0 none
1 caries arresting or sealant care
2 one surface filling
3 two or more surface fillings
4 = crown or bridge abutment
5 bridge element
6 pulp care
7 extraction
8 need for other care
9 = (specify)

FLUOROSIS

☐ (95)

0 normal
1 questionable
2 very mild
3 mild
4 moderate
5 severe

WHO 5434 ORH (8.86) 10 000

Original/duplicate examinations

If the recorder is responsible for organizing duplicate examinations, he/she should identify the subject and place a code "1" in box 11 for the first (original) examination and a code "2" in box 11 on the second survey form after the duplicate examination. If a third person has organized the duplicate examination, he/she should indicate to the recorder, but not to the examiner, which subjects are being re-examined. Data from the first examination only should be included in the survey analysis. It is important to note that, if data are submitted to WHO for summary, separate tables, giving comparisons between the first and duplicate examinations, will only be prepared if the codes 1 for the first and 2 for the duplicate examination are placed in box 11. The possibility of matching individual identification numbers has not been included in the standard WHO programme.

Examiner

If more than one examiner is participating in the survey, each examiner should be allotted a number. The examiner's number should be entered in box 12 on all forms.

Name

The name of the subject may be written in block letters, beginning with the family name. It should be noted that, in some countries, identification of survey subjects by name is not permitted, in which case this space should be left blank.

Age

Age should be recorded as age at last birthday. If it is not possible to obtain this information from the subject, or his/her parents or from school records or official records, it may be necessary to make an estimate on the basis of physical development, stage of tooth eruption, tooth wear, or by questioning the subject on historical events in his or her community. Local residents may be able to provide valuable assistance in this regard. Age should be expressed according to the international convention whereby age at birth is 0 years. In communities where age is normally expressed in another way, a conversion must be made. Where age has been estimated, the manner of estimation should be reported. The age in years should be entered in boxes 13 and 14. If the age is less than 10 years, "0" should be entered in box 13 (i.e., 6 years = 06).

Sex

This information should be recorded at the time of examination because it is not always possible to tell a person's sex from name alone. The appropriate code (1 for male, 2 for female) should be entered in box 15.

Population subgroups; ethnic groups and occupation

In different countries, ethnic and other groups are identified in different ways, e.g., by area or country of origin, race, colour, language, religion or tribal membership. There are as yet no internationally accepted criteria for this purpose. Local health and education authorities should be consulted before any decision as to which ethnic groups should be recorded. When this decision has been reached, a coding system should be made.

Note: A maximum of 9 different subgroups should be used (1–9). Since it is often not possible to identify a person's ethnic origin from name alone, ethnic group information must be recorded at the time of the examination and coded in box 16.

Government authorities should be consulted before the occupation groups to be recorded are selected. When this has been done, a coding system should be devised.

Note: A maximum of 9 different subgroups should be used (1–9). At the time of examination, the appropriate code should be entered in box 17.

For some surveys, information on ethnic origin and/or occupation may not be required. In that case, boxes 16 and 17 may be used to give more specific information on whichever of the two items is retained or on diet, religious customs, origin of water supply, etc. For example, it may be desirable to provide results separately for different socioeconomic levels within ethnic groups. In each case, the relevant codes should be provided.

Geographic location

Boxes 18 and 19 should be used to record the site where the examination is conducted. This allows up to 99 geographic locations (village, school, etc.) to be identified (01–99). A list relating each location to its code number should be prepared. Usually, only a few codes are needed.

Box 20 allows recording of information about each survey location. The purpose of including these data is to obtain general information

about availability of services at each survey site. Three codes are used:

1 – Urban site.
2 – Periurban area: this has been included in order to indicate areas surrounding major towns, which have very few health services of any kind and usually no access to oral health care facilities.
3 – Rural area, or small village.

According to local circumstances, a different coding may be prepared relating to availability of services. The categories should be described.

Other data

Three boxes—21, 22 and 23—have been provided for the inclusion of other information about the subjects or the survey location. Information such as level of fluoride in the water, or use of a chew stick can be recorded here; it would then be possible to summarize the results of the survey according to the different codes placed in these boxes. Again, an appropriate coding should be made for these items.

Basic oral health and treatment need assessment

The clinical examination should start with an overall look at the subject. General appearance, colour of face, symmetry, etc., should be noted. The examination should then proceed to the assessment of malocclusion.

Malocclusion (box 24)

Two levels of anomaly are distinguished, i.e., very slight (a twisted or tilted tooth or slight crowding or spacing (code 1)) and anomalies that are generally regarded as causing an unacceptable effect on facial appearance, or a significant reduction in masticatory function, or impairment of speech (code 2).

Gross defects such as cleft lip, cleft palate and pathological or surgical injury should be recorded separately under "Other conditions" (boxes 119 and 120), as the prevalence of these conditions is usually low and valid data can only be obtained from analysis of treatment records.

The following codes are used for recording malocclusion in box 24:

0 – No anomaly or malocclusion;
1 – Slight anomalies, such as one or more rotated or tilted teeth or

slight crowding or spacing, which disturb the regular alignment of the teeth;

2 – More serious anomalies, specifically, the presence of one or more of the following conditions of the four anterior incisors:
- maxillary overjet estimated to be 9 mm or more;
- mandibular overjet, anterior crossbite equal to or greater than a full tooth depth;
- open bite;
- midline shift estimated to be more than 4 mm; and
- crowding or spacing estimated to be more than 4 mm.

Note: Code gross defects under "Other conditions" (boxes 119 and 120).

Community Periodontal Index of Treatment Needs (CPITN) (boxes 25–30)

Indicators. Three indicators of periodontal status are used for this assessment: (1) presence or absence of gingival bleeding; (2) supra- or subgingival calculus: and (3) periodontal pockets—subdivided into shallow (4–5 mm) and deep (6 mm or more).

A specially designed lightweight probe with a 0.5-mm ball tip is used, bearing a black band between 3.5 and 5.5 mm from the ball tip. A list of manufacturers of this probe can be obtained from Oral Health, World Health Organization, 1211 Geneva 27, Switzerland.

Sextants. The mouth is divided into sextants defined by teeth numbers 18–14, 13–23, 24–28, 38–34, 33–43, and 44–48. A sextant should be examined only if there are two or more teeth present *and* not indicated for extraction. When only one tooth remains in a sextant, it should be included in the adjacent sextant.

Index teeth. For adults aged 20 years and over, the teeth to be examined are:

17	16	11	26	27
47	46	31	36	37.

The two molars in each posterior sextant are paired for recording, and if one is missing, there is no replacement. If no index teeth or tooth is present in a sextant qualifying for examination, all the remaining teeth in that sextant are examined.

For young people up to the age of 19 years, only six teeth—16, 11, 26, 36, 31, and 46—are examined. This modification is made in order

to avoid classifying the deepened crevices associated with eruption as periodontal pockets. For the same reason, when examining children under the age of 15, recording for pockets should not be attempted, i.e., only bleeding and calculus should be considered. If no index tooth is present in a sextant qualifying for examination, single fully erupted incisors or premolars may be substituted.

Sensing gingival pockets. An index tooth should be probed, using the probe as a "sensing" instrument to determine pocket depth and to detect subgingival calculus and bleeding response. The sensing force used should be no more than 20 grams. A practical test for establishing this force is to place the probe point under the thumb nail and press until blanching occurs. For sensing subgingival calculus, the lightest possible force that will allow movement of the probe ballpoint along the tooth surface should be used.

When inserting the probe, the ballpoint should follow the anatomical configuration of the surface of the tooth root. If the patient feels pain during probing, this is indicative of the use of too much force.

The probe tip should be inserted gently into the gingival pocket and the depth of insertion read against the colour coding. The total extent of the pocket should be explored: At least 6 points on each tooth should be examined: mesio-buccal, mid-buccal, disto-buccal, and the corresponding lingual sites.

Examination and recording. The incisor and either the first molars (up to 19 years) or the pairs of first and second molars (above 19 years) should be sensed and the highest score recorded in the appropriate box. Codes in descending order of severity are:

4 – pocket > 6 mm (black area of probe not visible)
3 – pocket 4 or 5 mm (gingival margin situated on black area of probe)
2 – calculus felt during probing but all the black area of the probe visible
1 – bleeding observed, directly or by using mouth mirror, after sensing
0 – healthy

These gradings are illustrated in the photographs on page 33.

Where non-index teeth are examined, the highest score found in the sextant is recorded in the appropriate box. If there are not at least two teeth remaining and not indicated for extraction in a sextant, the appropriate box should be cancelled by a cross (×).

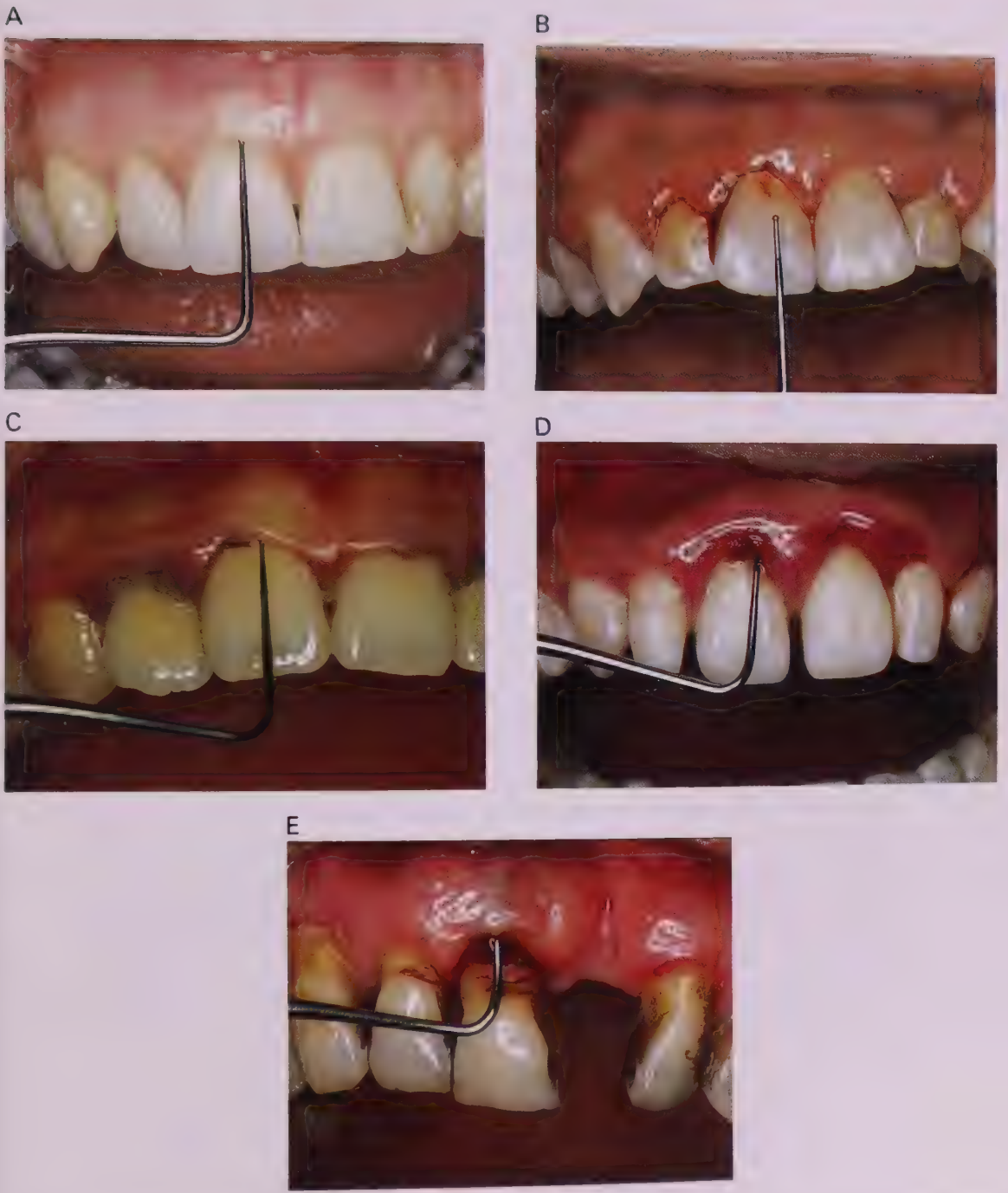


Fig. 2. Examples of coding according to the Community Periodontal Index of Treatment Needs.
A: CPITN = 0; B: CPITN = 1; C: CPITN = 2; D: CPITN = 3; E: CPITN = 4. (Photographs provided by Dr C. Holmgren, The Prince Philip Dental Hospital, Hong Kong.)

Individual tooth status and treatment need (boxes 31–94)

Method of assessing dental caries. The examination for dental caries should be conducted with a plane mouth mirror and an explorer. Radiography is not recommended because of the impracticability of using the equipment in all situations. It should be realized, however, that without radiographic information the need for restorative care will be underestimated. The extent of this underestimation varies with disease prevalence and the number of restorations in the population. In populations with very low, low, or moderate caries levels, the underestimate is likely to be of the order of 3–5%. Even in populations with high prevalence of disease, where a large amount of restorative care has been provided, the underestimate will only be of the order of 10–15%.

Examiners should adopt a systematic approach to the examination for dental caries, proceeding in an orderly manner from one tooth or tooth space to the adjacent tooth or tooth space. A tooth should be considered present in the mouth when any part of it is visible or can be touched with the tip of the explorer without unduly displacing soft tissue. If a permanent and a primary tooth occupy the same tooth space, the status of the permanent tooth only should be recorded.

Dentition status. A *numerical* coding system is used for recording the status of permanent teeth and an *alphabetical* coding system for primary teeth: boxes 31–46 are used for upper teeth and boxes 63–78 for lower teeth. Note that boxes pertaining to premolars or primary molars, cuspids and incisors are used for both primary and permanent teeth. A distinction is made solely by the use of alphabetical or numerical codings. An entry must be made in every box on the chart. Codes for the dental caries status of primary and permanent teeth are as follows:

Permanent tooth code	*Condition/status*	*Primary tooth code*
0	Sound	A
1	Decayed	B
2	Filled, with decay	C
3	Filled, no decay	D
4	Missing, as a result of caries	E
5	Missing, any other reason	—
6	Sealant, varnish	F
7	Bridge abutment or special crown	G
8	Unerupted tooth	—
9	Excluded tooth	—

Criteria for diagnosis and coding (primary tooth codes within parentheses) are:

0 (A) – *Sound tooth.* A tooth is recorded as sound if it shows no evidence of treated or untreated clinical caries. The stages of caries that precede cavitation, as well as other conditions similar to the early stages of caries, are excluded because they cannot be reliably diagnosed. Thus, teeth with the following defects, in the absence of other positive criteria, should be coded as sound:

- white or chalky spots;
- discoloured or rough spots;
- stained pits or fissures in the enamel that catch the explorer but do not have a detectably softened floor, undermined enamel, or softening of the walls;
- dark, shiny, hard, pitted areas of enamel in a tooth showing signs of moderate to severe fluorosis.

All questionable lesions should be coded as sound.

1 (B) – *Decayed tooth.* Caries is recorded as present when a lesion in a pit or fissure, or on a smooth tooth surface, has a detectably softened floor, undermined enamel or softened wall. A tooth with a temporary filling should also be included in this category. On approximal surfaces, the examiner must be certain that the explorer has entered a lesion. Where any doubt exists, caries should not be recorded as present.

2 (C) – *Filled tooth with decay.* A tooth is scored as filled with decay when it contains one or more permanent restorations *and* one or more areas that are decayed. No distinction is made between primary and secondary caries (i.e., whether or not the carious lesions are in physical association with the restoration(s)).

3 (D) – *Filled tooth with no decay.* Teeth are considered filled without decay when one or more permanent restorations are present and there is no secondary (recurrent) caries or other area of the tooth with primary caries. A tooth with a crown placed because of previous decay is recorded in this category. A tooth that has been crowned for reasons other than decay, e.g., trauma or as a bridge abutment, is recorded as "bridge abutment or special crown" and coded 7 (G).

4 (E) – *Tooth missing due to caries.* This score is used for permanent or primary teeth that have been extracted because of caries. For missing primary teeth, this score should be used only if the subject is at an age when normal exfoliation would not be a sufficient explanation for absence.

In some age groups, it may be difficult to distinguish between unerupted teeth (code 8) and extracted teeth. Basic knowledge of tooth eruption patterns, the status of the corresponding contralateral tooth, the appearance of the alveolar ridge in the area of the tooth space in question, and the caries status of other teeth in the mouth may provide helpful clues in making a differential diagnosis between unerupted and extracted teeth. It is emphasized that code 4 should not be used for teeth judged to be missing for any reason other than caries. For convenience, in fully edentulous arches, a single "4" should be placed in boxes 31 and 46 and/or 63 and 78, as appropriate, and the respective pairs of numbers linked with straight lines.

5 – *Permanent tooth missing for any other reason.* This code is used for permanent teeth judged to be absent congenitally, or extracted for orthodontic reasons or because of trauma, etc. This score is also used for permanent teeth that are judged to have been extracted because of periodontal disease.

As for code 4, two entries of code 5 can be linked by a line in cases of fully edentulous arches.

6 (F) *Sealant.* This code is used for teeth in which a fissure sealant has been placed on the occlusal surface; or for teeth in which the occlusal fissure has been enlarged with a rounded or "flame-shaped" bur, and a composite material placed. If a tooth with a sealant has decay, it should be coded as 1 (decayed).

7 (G) *Bridge abutment or special crown.* This code is used to indicate that a tooth forms part of a fixed bridge, i.e., is a bridge abutment. This code can also be used for crowns placed for reasons other than caries. *Note*: Missing teeth replaced by a bridge are coded 4 or 5, as for other missing teeth.

8 *Unerupted tooth.* This classification is restricted to permanent teeth and used only for a tooth space with an unerupted permanent tooth but without a primary tooth.

Teeth scored as unerupted are, of course, excluded from all calculations concerning dental caries. For differential diagnosis between extracted and unerupted teeth, see code 4.

9 - *Excluded tooth.* This code is used for any tooth that cannot be examined.

Decayed, Missing, and Filled Teeth Index (DMFT). Information on the Decayed, Missing, and Filled Teeth Index (DMFT) can be calculated from the information in boxes 31 to 46 and 63 to 78. The D-component includes all teeth with codes 1 or 2. The M-component comprises teeth with code 4 in subjects under 30 years of age, and teeth coded 4 and 5 for subjects 30 years and older, i.e., missing due to caries or for any other reason. *Note*: Previously only teeth missing due to caries were included in the DMFT index and in its M-component. The F-component includes only teeth with code 3. The basis for DMFT calculations is 32, i.e., all permanent teeth including wisdom teeth. Teeth with code 6 (sealant) or code 7 (crown, bridge abutment or element) are not included in the DMFT.

Treatment requirements of individual teeth. Immediately after the caries status of a tooth is recorded, and before proceeding to the next tooth space, the type of treatment required, if any, should be recorded (boxes 47–62 and 79–94). If no treatment is required, score "0" in the appropriate treatment box. (If this is not done, it will be impossible to determine later, when the data are processed, whether no treatment was necessary or whether the examiner or recorder omitted to make an appropriate entry.)

Countries vary greatly in the capacity of the dental profession to meet demands for oral health care and in professional attitudes and treatment techniques. There may therefore be wide variations in the findings of examiners from different areas on treatment needs. For example, code 1 (caries-arresting or sealant care) relates to various procedures for non-invasive care, some of which are still under development. Its use will be governed by the disease levels, resources, and policies applying to the community being surveyed. Despite this variation, data on treatment needs are of great value at local and national levels because they provide a reliable basis for estimating manpower requirements and costs of an oral health programme under prevailing or anticipated local conditions.

The codes and criteria for treatment needs are:

0 *None* (no treatment). This code is recorded if a tooth is sound, or if it is decided that a tooth cannot or should not be extracted or receive any other treatment.

1 – *Caries-arresting or sealant care.*
2 – *One surface filling.*
3 – *Two or more surface fillings.*

One of the codes 1, 2, or 3 should be used to indicate the treatment required to:

- treat initial, primary or secondary caries;
- repair damage due to trauma;
- treat discoloration of a tooth, a pulpal condition, or a developmental defect; or
- replace unsatisfactory fillings.
  A filling is considered unsatisfactory if one or more of the following conditions exist:
  - a *deficient margin* to an existing restoration that has leaked or is likely to permit leakage into the dentine. The decision as to whether or not a margin is deficient should be based on the examiner's clinical judgement, on evidence gained from the insertion of an explorer at the margin, or on the presence of severe staining of the tooth structure.
  - an *overhanging margin* of an existing restoration that causes obvious local irritation to the gingivae and cannot be removed by recontouring of the restoration;
  - a *fracture of an existing restoration* that either causes it to be loose or permits leakage into dentine.

4 – *Crown or bridge abutment.*
5 – *Bridge element*, i.e., that portion of a bridge that is replacing a missing tooth.
6 – *Pulp care.* This code is used to indicate a tooth that probably needs pulp care prior to restoration with a filling or crown because of deep and extensive caries or because of tooth mutilation or trauma. *Note*: A probe should *never* be inserted into the depth of a cavity to confirm the presence of a suspected pulp exposure.
7 *Extraction.* A tooth is recorded as "indicated for extraction", *depending on the treatment possibilities available*, when:

- caries has so destroyed the crown that it cannot be restored;
- caries has progressed to such an extent that there is an obvious and open exposure of the pulp and restoration of the tooth is not possible;
- only the roots remain;
- periodontal disease has progressed so far that the tooth is

loose or functionless and, in the clinical judgement of the examiner, cannot be restored to a firm and functional state by periodontal therapy;

- a tooth needs to be extracted to make way for a prosthesis; or
- extraction is required for orthodontic or cosmetic reasons, or because of impaction.

8,9 – *Need for other care.* The examiner should specify the types of care for which codes 8 and 9 are used.

Fluorosis (box 95)

It is recommended that the *Dean's index* criteria be used. The recording is made on the basis of the two teeth that are most affected, i.e., the score recorded must apply to *two* teeth. The score should be entered in box 95. The following codes are used:

0 – *Normal.* The enamel surface is smooth, glossy and usually a pale creamy-white colour.

1 – *Questionable.* The enamel shows slight aberrations from the translucency of normal enamel, which may range from a few white flecks to occasional spots. This classification is used where the classification "normal" is not justified.

2 – *Very mild.* Small opaque paper-white areas scattered irregularly over the tooth but involving less than 25% of the labial tooth surface.

3 – *Mild.* The white opacity of the enamel of the teeth is more extensive than in category 2, but covers less than 50% of the tooth surface.

4 – *Moderate.* The enamel surfaces of the teeth show marked wear and brown stain is frequently a disfiguring feature.

5 – *Severe.* The enamel surface is badly affected and hypoplasia is so marked that the general form of the tooth may be affected. There are pitted or worn areas and brown stains are widespread; the teeth often have a corroded appearance.

Photographs illustrating the Dean's index codes for fluorosis, and other disorders of the enamel, as described below, are to be found on pages 40 and 41.

Fluorosis lesions resulting from the ingestion of excess fluoride, particularly those in the questionable and mild categories, are usually bilaterally symmetrical and tend to show a horizontal striated pattern across the tooth. As some forms of fluorosis are difficult to distinguish from idiopathic opacities, collection of a sample of drinking-water from

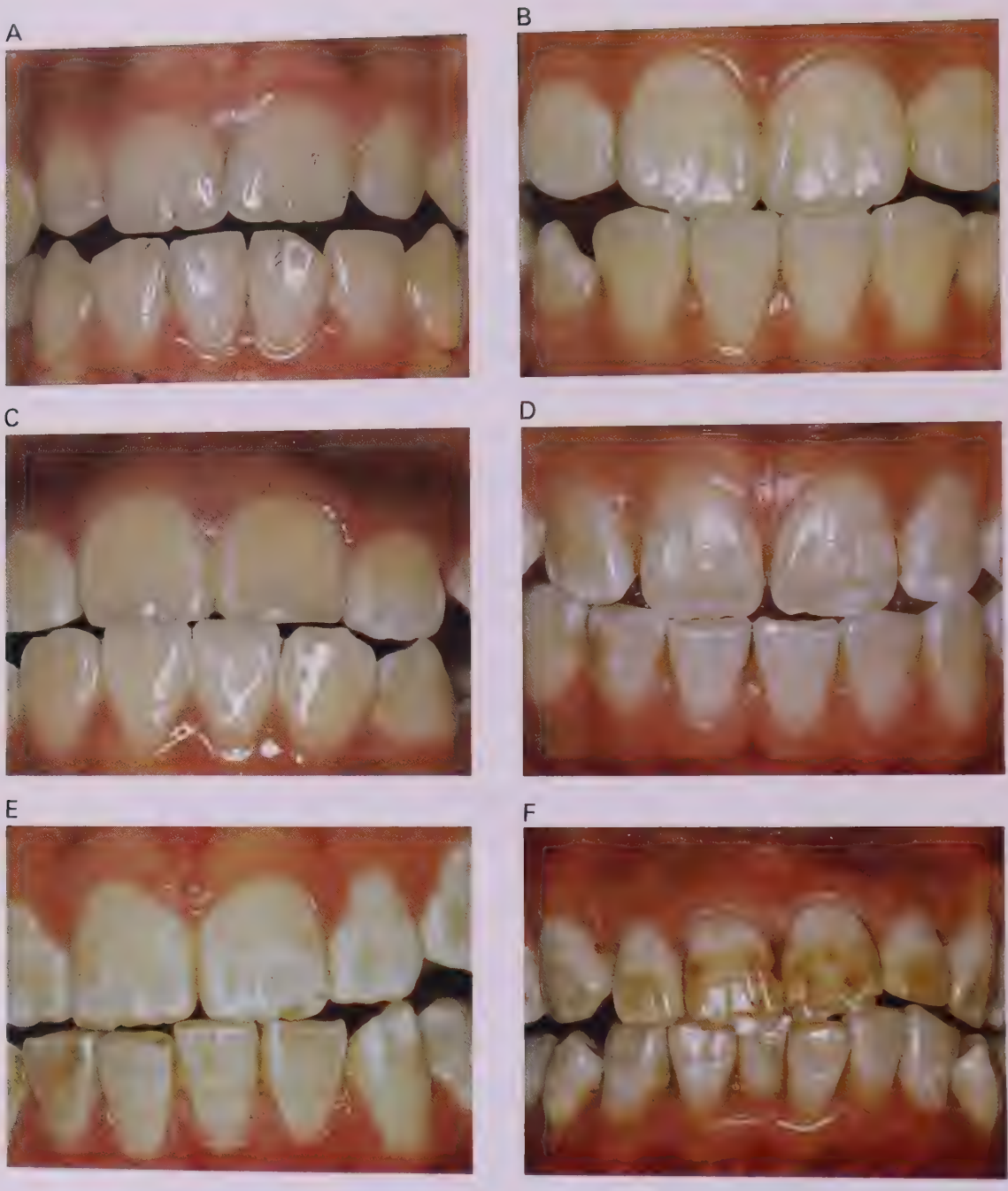


Fig. 3. Examples of coding of fluorosis according to the Dean's Index criteria.
A: code 0 (normal); B: code 1 (questionable); C: code 2 (very mild); D: code 3 (mild); E: code 4 (moderate); F: code 5 (severe). (Photographs provided by Dr R.W. Evans, The Prince Philip Dental Hospital, Hong Kong.)

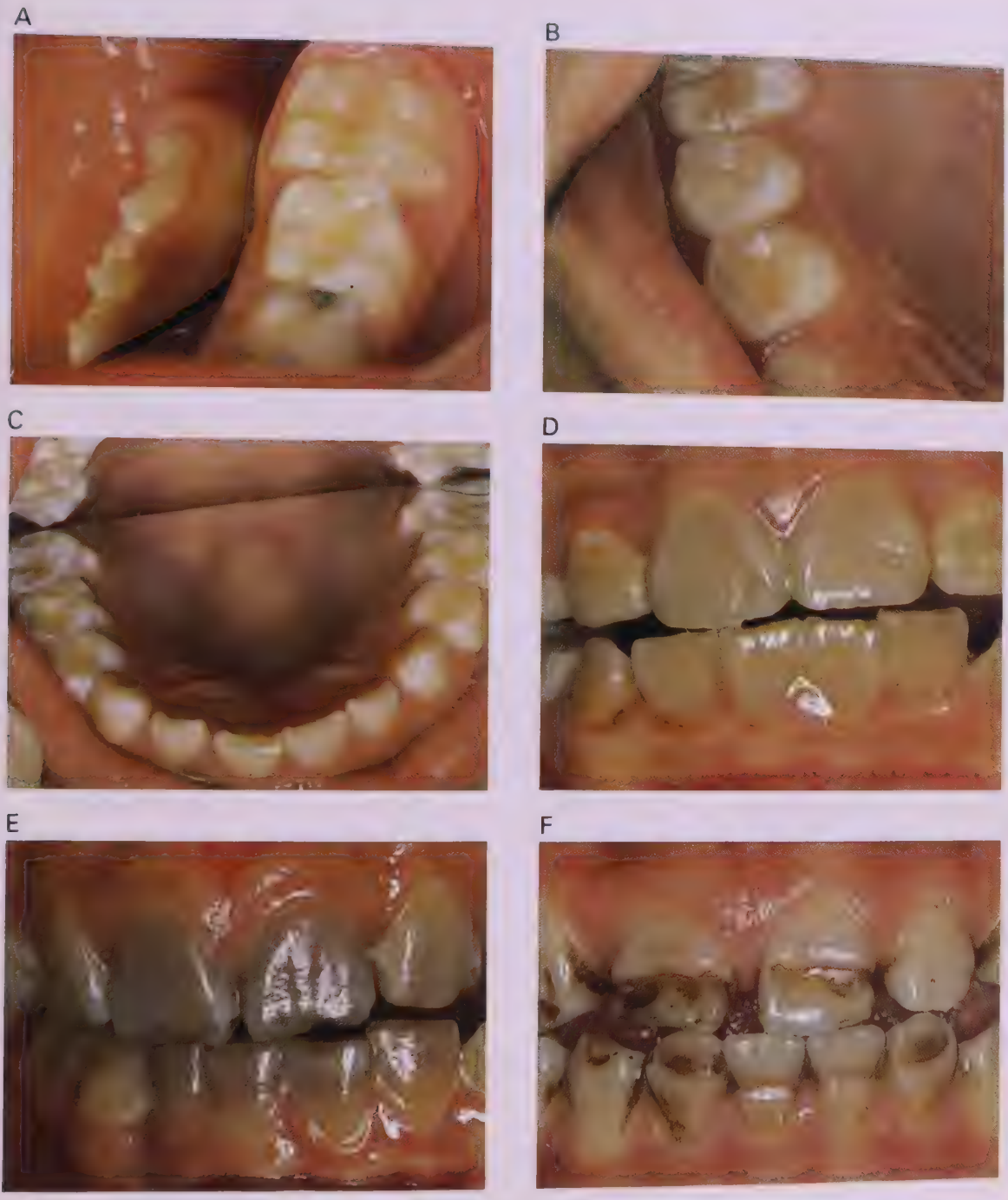


Fig. 4. Examples of coding of fluorosis and other disorders of the enamel.
A: normal (code 0), caries on distal surface; B: very mild fluorosis (code 2), on second premolar; C: mild fluorosis (code 3), on first permanent molar; D: tetracycline stain (code 3, box 96); E: tetracycline stain; F: tetracycline stain and hypoplasia. (Photographs provided by Dr R.W. Evans, The Prince Philip Dental Hospital, Hong Kong.)

the area is very important so that the recordings can later be correlated with the fluoride content of the water.

Opacities and other enamel disorders (boxes 96–98)

Idiopathic enamel opacities are usually oval in form and not translucent. They are not usually symmetrically distributed in the mouth and are seldom found on more than one or two teeth. Maxillary central incisors are most often affected. The following codes are used in box 96:

0 – *None*; no opacities or other enamel disorders, except fluorosis as recorded in box 95.
1 – *Opacities.*
2 – *Hypoplasia.*
3 – *Tetracycline stain.*
4 – *Mutilation*; may be due to traditional grinding of teeth in some cultures.
5 – *Attrition.*
6 – *More than one of the above conditions.* The combination should be specified by the numbers 1 to 5.

Boxes 97 and 98 are reserved for recording the number of teeth affected by the conditions mentioned above (e.g., if there are six teeth with hypoplasia, the recording in boxes 97 and 98 should be 06). If none of the above conditions exist, the recording is 00.

Wearing of, and need for, dentures (boxes 99–102)

The wearing of dentures should be recorded for each jaw (box 99, upper jaw; box 100, lower jaw). The following codes are provided for this:

0 – *Not wearing a denture.*
1 – *Wearing a partial denture.*
2 – *Wearing a full denture.*

A recording should be made for each jaw on the need for dentures (box 101, upper jaw; box 102, lower jaw), according to the following codes:

0 – *No denture needed.*
1 – *Need for denture repair.*
2 – *Need for partial denture.*
3 – *Need for full denture.*

The WHO standard computer program will check the codes recorded in this section against the indications of individual tooth status and treatment need in boxes 31 and 94, (*a*) for full dentures,

where all teeth are indicated as absent or in need of extraction, (*b*) to avoid duplication in recording of need for bridge or partial dentures, and (*c*) as a logic check.

Lesions of the oral mucosa and bone (boxes 103–113)

A screening examination of the oral mucosa and the hard and soft tissues in and around the mouth should be made on every adult subject examined. The examination should be thorough and systematic; it should begin with the lips, and proceed to the upper and lower sulcus and retromolar area, the upper and lower labial mucosa, the left buccal mucosa and the right buccal mucosa. The palatal mucosa and the surface and margins of the tongue should be inspected and the mobility of the tongue checked. Finally, the inferior surface of the tongue and the floor of the mouth should be examined. Examination of the oral mucosa is facilitated by the use of two mouth mirrors to retract tissues, as well as for inspection. Mucosal or facial tissues that seem to be abnormal, as well as the submandibular, sublingual, and cervical lymph nodes, should be palpated digitally.

Boxes 103–107 and 108–112 should be used to record any conditions found, using the codes specified in the *International Classification of Diseases—application to dentistry and stomatology (ICD-DA)*. Conditions or diseases of the oral mucosa, to which examiners should be alert during screening examinations, include the following:

acute necrotizing ulcerative gingivitis	101.00
acute necrotizing ulcerative stomatitis	101.01
suspected oral cancer	140–146
oral lichen planus	697.0
leukoplakia of oral mucosa	528.6
candidiasis	112.00–112.09

Disorders involving bone include the following conditions:

radicular cyst	522.8
osteoma	210
osteitis	526.40
osteomyelitis	526.41
ameloblastoma or other odontogenic tumour	140–146 or 210

Box 113 is provided for recording the observation of a lesion that cannot be clearly identified.

Space is allowed for the recording of only two disease conditions of the oral mucosa and bone. If there are more than two, the most severe conditions should be recorded.

Assessment of the temporomandibular joint (box 114)

Box 114 provides for the recording of the status of the temporomandibular joint (TMJ). Codes for this assessment are as follows:

0 – *Normal.* TMJ functions without pain, sounds or other signs of dysfunction.
1 – *Clicking.* TMJ functions without pain or other signs of dysfunction, but clicking is heard on opening and closing.
2 – *Self-correcting blocking.* TMJ occasionally dislocates but relocates without professional care.
3 – *Dislocation of TMJ.* There is spontaneous dislocation that requires professional care.
4 – *Pain related to TMJ.* There is pain in the TMJ area or elsewhere in the head, neck, or shoulder region related to joint dysfunction.

Conditions needing immediate care (boxes 115–118)

The examiner needs to use clinical judgement in deciding whether emergency treatment is required. There is a need for immediate care if pain, infection or serious illness will result unless treatment is provided within a certain period of time. This period may vary from a few days to a month, depending on the availability of oral health services. Examples of conditions that require immediate attention include acute periapical abscess and acute necrotizing ulcerative gingivitis. Gross caries and chronic alveolar abscesses may also be recorded in box 117.

Three boxes are provided for the recording of the presence (code 1) of the following conditions:

- a life-threatening condition (oral cancer or precancerous lesions), or other severe condition with clear oral manifestation—box 115;
- fractures of the jaw—box 116;
- pain or infection that needs immediate relief—box 117.

If the subject is referred for care, a 1 should be recorded in box 118.

The items coded in boxes 115–118 are not mutually exclusive; several recordings may be made when more than one condition requiring immediate attention is present.

Other conditions (boxes 119 and 120)

The investigator should indicate the presence of any other conditions in boxes 119 and 120 and should provide a list of the codes used on the survey summary sheet (see Annex 3).

6. Post-survey Action and Preparation of Survey Reports

Sending forms for analysis

When the survey has been completed, the principal investigator should ensure that all the forms are assembled in numerical order (by registration number) to facilitate checking. It is not necessary to sort the forms by location or age group, as this will be done by the computer.

When the data are to be analysed locally without assistance from WHO, the principal investigator should arrange for delivery of the forms to the appropriate computer centre. If the analysis is to be performed by WHO, the forms should be tied in bundles of about 100 and each bundle should be clearly labelled with the name of the country where the survey was carried out. The survey summary sheets provided by WHO should be completed in duplicate, one copy being retained by the investigator and the other included in the package of forms being dispatched for processing. Parcels should be packed and fastened securely so that forms are not lost, damaged or jumbled during transit. Parcels of forms should be addressed to Oral Health, World Health Organization, 1211 Geneva 27, Switzerland.

Provided that notice is given some months in advance of the arrival of the forms, that all necessary information has been included on the survey summary sheets, and that all the records have been coded correctly and clearly, the analysis by WHO should be completed within two months of receipt of the raw data. Where surveys include more than 5000 subjects, a longer period may be required for the analysis. In that event, investigators will be notified. Presentation of incomplete information, inaccurate or unreadable coding of observations, and inadequate packaging of completed forms are likely to cause delays.

Preparation of survey reports

The report of the survey should usually contain the following information:

(*a*) *Statement of the purposes of the survey*
This statement should include a succinct and clear description of the aims of the survey and the expected ways in which the results will be used.

(*b*) *Materials and methods*
Under this heading, it is customary to include the following:

- *Area and population surveyed.* A general description of the geographic region and of the people examined is required.
- *The nature of the information collected and the methods used.* A description is required of the type of information collected and of the methods used to collect the data, e.g., questionnaire, interview, or clinical examination. *It is also essential to indicate the year of data collection.* If reference is made to methods outlined in this manual, it is not necessary to describe the clinical examination in detail.
- *Sampling method.* An explanation should be given of the method of sampling that was used, the size of the total sample and subsamples, and the extent to which the sample is considered representative of the study population. The number and description of persons who were selected for the sample but not examined, and any sampling problems encountered should be reported.
- *Personnel and physical arrangements.* It is desirable to give a brief account of the physical arrangements at the examination sites, the equipment used, and the organization, training, and experience of the personnel employed in collecting, processing, and tabulating the data. Arrangements made for standardization and calibration of examiners and for checking the consistency of examiners during the course of the survey should be described.
- *Statistical analysis and computational procedure.* The statistical methods used in compiling the final summary tables from the raw data should be described briefly or references given. For example, reference can be made to methods described in this manual, where appropriate.
- *Cost analysis.* Information on survey expenses is of considerable interest. Reporting of costs of planning, calibration trials, field work, supervision, statistical analysis, salaries, and overheads

facilitates the critical evaluation of survey methods and provides useful economic data.

- *Reliability and reproducibility of the results.* It is important to include data on between-examiner and within-examiner variability as revealed by pre-survey calibration trials and duplicate examinations conducted during the course of the survey. This information gives the planner for the area and the reader of the report an indication of the degree of examiner error that may apply to any of the results.

(c) Results

Results may be presented in several ways. Brevity is important. The text should contain a short description of the more important results and at least the following five summary tables:

Table 1: Total number of subjects examined, by age or age group.

Table 2: Number and percentage of subjects with one or more DMF teeth; number and percentage of subjects with one or more decayed teeth; mean number of DMF teeth per person.

Table 3: Mean number of decayed teeth per person; mean number of filled teeth per person; mean number of filled teeth with further decay per person; mean number of missing teeth per person.

Table 4: Percentage of subjects with healthy periodontal tissues; percentage of subjects with bleeding only; percentage of subjects with bleeding and calculus only; percentage of subjects with bleeding, calculus, and shallow pockets; percentage of subjects with bleeding, calculus, shallow pockets, and deep pockets.

Table 5: Mean number of sextants with bleeding or higher score, calculus or higher score, shallow pockets or higher score, deep pockets, and healthy periodontal tissue; mean number of sextants excluded from examination.

Other tables may be included in the text, or in an annex if they are numerous. A few diagrams—graphs, histograms, bar-charts, or pie-charts—may be used to illustrate points that are neither easily explained in the text, nor easily visualized from tables. A cardinal rule for both figures and tables is that they should be clearly labelled, so that they are readily comprehensible without reference to the text.

The basic summary tables provided by the WHO standard program address two main areas—oral health status and treatment needs of the population.

(d) Discussion and conclusions

The results of the survey should be discussed under two headings:

- The *oral health status* of the population should be compared with data from previous surveys of the same population; if such data are unavailable, comparison may be made with results of surveys in similar or neighbouring populations.
- *Treatment needs* of the population examined should be reported together with a brief discussion of the different treatment approaches possible, and of the implications of each approach for the future oral health status of the population.

(The reader is referred to footnote *a* on page 2, and to the WHO publication, *Planning oral health services*,[a] for explanation, with examples, of the use of data from basic health surveys in planning.)

(e) Summary or abstract

A brief summary of the report is required, of a suitable length for use as an abstract. The objectives of the study and the number of people examined should be stated and a few of the more important results given for caries and periodontal diseases in two or three age groups for the whole sample: for example, the proportion of subjects affected by caries, the mean DMFT, and the proportion with bleeding and/or calculus and pocketing may be included. Any unusual or unexpected results obtained should be noted.

---

[a] *Planning oral health services*. Geneva, World Health Organization, 1980 (Offset Publication, No. 53).

Annex 1

Tables prepared from survey data

The following tables will be prepared by the WHO standard computer program from the data collected in a basic oral health survey. (Data are reported separately by age group: single years up to age 19,[a] 20–24, 25–29, 30–34, 35–44, 45–54, 55–64, 65–74, 75–84, and 85+.)

Oral health status

Percentage of people affected by caries (DMF teeth).
Percentage of people with active caries (DT).
Mean DMFT, DT, MT, FT.
Mean number of teeth present in mouth.
Percentage totally edentulous.
Number and percentage of people with any missing teeth and mean number of missing teeth (not 3rd molars).
Distribution of persons according to number of teeth missing: 0, 1, 2–3, 4–6, 7–10, 11–15, 16–20, 21–27, all.
Distribution of persons with single missing teeth, 2 adjacent missing teeth, 3 or more adjacent missing teeth, subdivided by anterior and posterior teeth.
Percentage of people with healthy periodontal tissues.
Percentage of people with bleeding only.
Percentage of people with bleeding and calculus only.
Percentage of people with bleeding and calculus and shallow pockets.
Percentage of people with bleeding and calculus and shallow pockets or deep pockets.
Mean numbers of sextants with: bleeding or higher score, calculus or higher score, shallow pockets or higher score, deep pockets.
Percentage of people with 0, 1, 2, 3, 4, 5, or 6 healthy sextants.
Percentage of people with 0, 1, 2, 3, 4, 5, or 6 sextants with deep pockets.

---

[a] There is an option for use of single years or a 5-year age group for those aged 15–19.

Percentage of age group 10–20 years needing orthodontic care.
Percentage of population with fluorosis.
Distribution of fluorosis codes by number and percentage affected.
Number and percentage of people wearing dentures: full upper, full lower, partial upper, partial lower, upper and lower (full or partial) (*a*) in good condition; (*b*) needing repair or replacement.
Summaries of data on opacities, other enamel disorders, oral mucosal and bone lesions, and temporomandibular joint conditions; also, need for immediate care.

Treatment need

Percentage of people needing each level of treatment, plus mean number of sextants for levels 2 and 3.
Percentage of people needing extractions and mean number of teeth needing extraction.
Percentage of people needing any restorative care and mean number of teeth needing restoration.
Mean number of teeth needing 0, 1, 2, or more surfaces or crowns.
Distribution of people needing 1 surface restoration only; 1 or more surface restorations; crown; pulp care, and mean number of teeth in each category.
Replacement care for missing teeth; percentage of people needing dentures: full upper, full lower, partial upper, partial lower, upper and lower (full or partial), or fixed replacement of missing teeth.

Annex 2

Checklist of data for survey planning and sampling design

Country: . . . . . .
Principal investigator: . . . . . .
Address: . . . . . .
. . . . . .
Area(s) or region(s) to be surveyed: . . . . . .
. . . . . .

POPULATION OF AREA	SCHOOL-AGE POPULATION	SCHOOL-ATTENDING POPULATION
(estimate)	(estimate of number or percentage)	(estimate of number or percentage)
. . . . .	. . . . .	. . . . .
. . . . .	. . . . .	. . . . .

*Best information or estimate of disease level in population**:

CARIES	PERIODONTAL DISEASE	OTHER (SPECIFY)
. . . . .	. . . . .	. . . . .
. . . . .	. . . . .	. . . . .
. . . . .	. . . . .	. . . . .

* Please supply survey data if available — if not, please estimate prevalence as high, moderate, or low at ages 6 years, 12 years, and for adults.

Important subgroups or divisions in population (indication of which subgroups are important and why):

Urban/rural: . . . . . .
Ethnic: . . . . . .
Religious: . . . . . .

(*continued overleaf*)

Dietary regime: .....
Habits, e.g., betel or tobacco use, ritual abrasion, etc.: .....
.....
Educational levels: .....
Socioeconomic levels: .....

Oral health services in operation or being planned (please give brief description under the headings of):

Emergency: .....
Preventive programme: .....
School services: .....
Other services: .....
Private practice: .....
Personnel and finance available for study: .....

Size of survey population ☐
Do you wish to make duplicates? ☐

Annex 3

Survey summary based on WHO Oral Health Assessment Form (1986)

Country: ..... Date: .....
Principal investigator: .....
Address: .....
.....
Identification numbers used:
from ..... to .....
from ..... to .....
from ..... to .....
Age ranges examined: .....

Examiner code (box 12)	Ethnic group or alternative code (box 16) (if alternative specify)	Occupation or alternative code (box 17) (if alternative, specify)
..... 1	 1	 1
..... 2	 2	 2
..... 3	 3	 3
..... 4	 4	 4
..... 5	 5	 5
..... 6	 6	 6
..... 7	 7	 7
..... 8	 8	 8
..... 9	 9	 9

Geographic location code (boxes 18 and 19)	Other data (boxes 21, 22 and 23) specify	Other conditions (boxes 119 and 120) specify
..... 01	 1	 1
..... 02	 2	 2
..... 03	 3	 3
..... 04	 4	 4
..... 05	 5	 5
..... 06	 6	 6
..... 07	 7	 7
..... 08	 8	 8
..... 09	 9	 9
..... 10		
..... 11		

If more than 11, continue overleaf

WHO publications may be obtained, direct or through booksellers, from:

ALGERIA: Entreprise nationale du Livre (ENAL), 3 bd Zirout Youcef, ALGIERS

ARGENTINA: Carlos Hirsch, SRL, Florida 165, Galerías Güemes, Escritorio 453/465, BUENOS AIRES

AUSTRALIA: Hunter Publications, 58A Gipps Street, COLLINGWOOD, VIC 3066 — Australian Government Publishing Service *(Mail order sales)*, P.O. Box 84, CANBERRA A.C.T. 2601; *or over the counter from:* Australian Government Publishing Service Bookshops *at*: 70 Alinga Street, CANBERRA CITY A.C.T. 2600; 294 Adelaide Street, BRISBANE, Queensland 4000; 347 Swanston Street, MELBOURNE, VIC 3000; 309 Pitt Street, SYDNEY, N.S.W. 2000; Mt Newman House, 200 St. George's Terrace, PERTH, WA 6000; Industry House, 12 Pirie Street, ADELAID, SA 5000; 156–162 Macquarie Street, HOBART, TAS 7000 — R. Hill & Son Ltd., 608 St. Kilda Road, MELBOURNE, VIC 3004; Lawson House, 10–12 Clark Street, CROW'S NEST, NSW 2065

AUSTRIA: Gerold & Co., Graben 31, 1011 VIENNA I

BANGLADESH: The WHO Representative, G.P.O. Box 250, DHAKA 5

BELGIUM: *For books:* Office International de Librairie s.a., avenue Marnix 30, 1050 BRUSSELS. *For periodicals and subscriptions:* Office International des Périodiques, avenue Louise 485, 1050 BRUSSELS — *Subscriptions to World Health only:* Jean de Lannoy, 202 avenue du Roi, 1060 BRUSSELS

BHUTAN: *see* India, WHO Regional Office

BOTSWANA: Botsalo Books (Pty) Ltd., P.O. Box 1532, GABORONE

BRAZIL: Centro Latinoamericano de Informação em Ciencias de Saúde (BIREME), Organização Panamericana de Saúde, Sector de Publicações, C.P. 20381 - Rua Botucatu 862, 04023 SÃO PAULO, SP

BURMA: *see* India, WHO Regional Office

CANADA: Canadian Public Health Association, 1335 Carling Avenue, Suite 210, OTTAWA, Ont. K1Z 8N8. (Tel: (613) 725–3769. Telex: 21–053–3841)

CHINA: China National Publications Import & Export Corporation, P.O. Box 88, BEIJING (PEKING)

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA: *see* India, WHO Regional Office

DENMARK: Munksgaard Export and Subscription Service, Nørre Søgade 35, 1370 COPENHAGEN K (Tel: + 45 1 12 85 70)

FIJI: The WHO Representative, P.O. Box 113, SUVA

FINLAND: Akateeminen Kirjakauppa, Keskuskatu 2, 00101 HELSINKI 10

FRANCE: Librairie Arnette, 2 rue Casimir-Delavigne, 75006 PARIS

GERMAN DEMOCRATIC REPUBLIC: Buchhaus Leipzig, Postfach 140, 701 LEIPZIG

GERMANY FEDERAL REPUBLIC OF: Govi-Verlag GmbH, Ginnheimerstrasse 20, Postfach 5360, 6236 ESCHBORN — Buchhandlung Alexander Horn, Friedrichstrasse 39, Postfach 3340, 6200 WIESBADEN

GHANA: Fides Enterprises, P.O. Box 1628, ACCRA

GREECE: G.C. Eleftheroudakis S.A., Librairie internationale, rue Nikis 4, ATHENS (T. 126)

HONG KONG: Hong Kong Government Information Services, Beaconsfield House, 6th Floor, Queen's Road, Central, VICTORIA

HUNGARY: Kultura, P.O.B. 149, BUDAPEST 62

INDIA: WHO Regional Office for South-East Asia, World Health House, Indraprastha Estate, Mahatma Gandhi Road, NEW DELHI 110002

INDONESIA: P.T. Kalman Media Pusaka, Pusat Perdagangan Senen, Block 1, 4th Floor, P.O. Box 3433/Jkt, JAKARTA

IRAN (ISLAMIC REPUBLIC OF): Iran University Press, 85 Park Avenue, P.O. Box 54/551, TEHERAN

IRELAND: TDC Publishers, 12 North Frederick Street, DUBLIN 1 (Tel: 744835–749677)

ISRAEL: Heiliger & Co., 3 Nathan Strauss Street, JERUSALEM 94227

ITALY: Edizioni Minerva Medica, Corso Bramante 83–85, 10126 TURIN; Via Lamarmora 3, 20100 MILAN; Via Spallanzani 9, 00161 ROME

JAPAN: Maruzen Co. Ltd., P.O. Box 5050, TOKYO International, 100–31

JORDAN: Jordan Book Centre Co. Ltd., University Street, P.O. Box 301 (Al-Jubeiha), AMMAN

KUWAIT: The Kuwait Bookshops Co. Ltd., Thunayan Al-Ghanem Bldg, P.O. Box 2942, KUWAIT

LAO PEOPLE'S DEMOCRATIC REPUBLIC: The WHO Representative, P.O. Box 343, VIENTIANE

LUXEMBOURG: Librairie du Centre, 49 bd Royal, LUXEMBOURG

MALAWI: Malawi Book Service, P.O. Box 30044, Chichiti, BLANTYRE 3

WHO publications may be obtained, direct or through booksellers, from:

MALAYSIA: The WHO Representative, Room 1004, 10th Floor, Wisma Lim Foo Yong (formerly Fitzpatrick's Building), Jalan Raja Chulan, KUALA LUMPUR 05–10; P.O. Box 2550, KUALA LUMPUR 01–02; Parry's Book Center, 124–1 Jalan Tun Sambanthan, P.O. Box 10960, 50730 KUALA LUMPUR

MALDIVES: *See* India, WHO Regional Office

MEXICO: Librería Internacional, S.A. de C.V., Av. Sonora 206, 06100-MÉXICO, D.F.

MONGOLIA: *see* India, WHO Regional Office

MOROCCO: Editions La Porte, 281 avenue Mohammed V, RABAT

NEPAL: *see* India, WHO Regional Office

NETHERLANDS: Medical Books Europe BV, Noorderwal 38, 7241 BL LOCHEM

NEW ZEALAND: New Zealand Government Printing Office, Publishing Administration, Private Bag, WELLINGTON; Walter Street, WELLINGTON; World Trade Building, Cubacade, Cuba Street, WELLINGTON, *Government Bookshops at:* Hannaford Burton Building, Rutland Street, Private Bag, AUCKLAND; 159 Hereford Street, Private Bag, CHRISTCHURCH; Alexandra Street, P.O. Box 857, HAMILTON; T & G Building, Princes Street, P.O. Box 1104, DUNEDIN — R. Hill & Son Ltd, Ideal House, Cnr Gillies Avenue & Eden Street, Newmarket, AUCKLAND 1

NORWAY: Tanum — Karl Johan A.S., P.O. Box 1177, Sentrum, N-0107 OSLO 1

PAKISTAN: Mirza Book Agency, 65 Shahrah–E–Quaid–E–Azam, P.O. Box 729, LAHORE 3

PAPUA NEW GUINEA: The WHO Representative, P.O. Box 646, KONEDOBU

PHILIPPINES: World Health Organization, Regional Office for the Western Pacific, P.O. Box 2932, MANILA

PORTUGAL: Livraria Rodrigues, 186 Rua do Ouro, LISBON 2

REPUBLIC OF KOREA: The WHO Representative, Central P.O. Box 540, SEOUL

SINGAPORE: The WHO Representative, 144 Moulmein Road, SINGAPORE 1130; Newton P.O. Box 31, SINGAPORE 9122

SOUTH AFRICA: *Contact major book stores*

SPAIN: Ministerio de Sanidad y Consumo, Centro de publicaciones, Documentación y Biblioteca, Paseo del Prado 18, 28014 MADRID — Comercial Atheneum S.A., Consejo de Ciento 130–136, 08015 BARCELONA; General Moscardó 29, MADRID 20 — Librería Díaz de Santos, P.O. Box 6050, 28006 MADRID; Balmes 417 y 419, 08022 BARCELONA

SRI LANKA: *see* India, WHO Regional Office

SWEDEN: *For books:* Aktiebolaget C.E. Fritzes Kungl. Hovbokhandel, Regeringsgatan 12, 103 27 STOCKHOLM. *For periodicals:* Wennergren-Williams AB, Box 30004, 104 25 STOCKHOLM

SWITZERLAND: Medizinischer Verlag Hans Huber, Länggassstrasse 76, 3012 BERN 9

THAILAND: *see* India, WHO Regional Office

UNITED KINGDOM: H.M. Stationery Office: 49 High Holborn, LONDON WC1V 6HB; 13a Castle Street, EDINBURGH EH2 3AR, 80 Chichester Street, BELFAST BT1 4JY; Brazennose Street, MANCHESTER M60 8AS; 258 Broad Street, BIRMINGHAM B1 2HE; Southey House, Wine Street, BRISTOL BS1 2BQ. *All mail orders should be sent to:* HMSO Publications Centre, 51 Nine Elms Lane, LONDON SW8 5DR

UNITED STATES OF AMERICA: *Copies of individual publications (not subscriptions):* WHO Publications Center USA, 49 Sheridan Avenue, ALBANY, NY 12210. *Subscription orders and correspondence concerning subscriptions should be addressed to the* World Health Organization, Distribution and Sales, 1211 GENEVA 27, Switzerland. *Publications are also available from the* United Nations Bookshop, NEW YORK, NY 10017 (*retail only*)

USSR: *For readers in the USSR requiring Russian editions:* Komsomolskij prospekt 18, Medicinskaja Kniga, MOSCOW — *For readers outside the USSR requiring Russian editions:* Kuzneckij most 18, Meždunarodnaja Kniga, MOSCOW G-200

VENEZUELA: Librería Medica Paris, Apartado 60.681, CARACAS 106

YUGOSLAVIA: Jugoslovenska Knjiga, Terazije 27/II, 11000 BELGRADE

Special terms for developing countries are obtainable on application to the WHO Representatives or WHO Regional Offices listed above or to the World Health Organization, Distribution and Sales Service, 1211 Geneva 27, Switzerland. Orders from countries where sales agents have not yet been appointed may also be sent to the Geneva address, but must be paid for in pounds sterling, US dollars, or Swiss francs. Unesco book coupons may also be used.

Prices are subject to change without notice.

Basic oral health surveys provide a sound basis for estimating the present oral health status of a population and its future needs for oral health care. The methods described in the previous editions of this manual have been used by more than 100 health administrations in conducting oral health surveys. The present edition takes account of the experience gained in these surveys, as well as of the dramatic changes that have occurred in the oral health status of many populations in the last ten years. In particular, it contains details of the Community Periodontal Index of Treatment Needs, which has been adopted by both the World Health Organization and the International Dental Federation as the standard for collecting data on periodontal treatment needs of populations and for the planning and monitoring of oral health services.

Price: Sw. fr. 14.–

ISBN 92 4 154216 0